DOCUMENT RESUME

ED 360 088 PS 021 614

AUTHOR Morgan, Harry
TITLE An Analysis of Gardner's Theory of Multiple Intelligence.
PUB DATE 92
NOTE 41p.; Paper presented at the Annual Meeting of the Eastern Educational Research Association (1992).
PUB TYPE Information Analyses (070) -- Viewpoints (Opinion/Position Papers, Essays, etc.) (120)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Cognitive Development; Cognitive Processes; *Cognitive Style; Criticism; *Epistemology; *Factor Analysis; Field Dependence Independence; Intelligence Quotient; Literature Reviews; *Psychological Characteristics; Theories
IDENTIFIERS Gardner (Howard); *Multiple Intelligences

ABSTRACT

The theory of multiple intelligence (MI) propounded by Gardner and Hatch suggests that human beings have seven distinct units of intellectual functioning, and that these units are actually separate intelligences with their own observable and measurable abilities. These intelligences were identified as logical-mathematical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal. These units, however, bear striking resemblance to cognitive style constructs and intelligence quotient factors identified by others in unified theories of intelligence. In fact, MI theory merely adapts factors identified as primary abilities in factor analyses of data derived from intelligence tests and relabels them as intelligences. A review of the literature on cognitive styles shows numerous compatibilities between styles of cognition and the MI intelligences. For example, the logical-mathematical intelligence is applied to individuals who are sensitive to logical or numerical patterns and have the ability to handle long chains of reasoning, and whose ideal career is as scientists or mathematicians. These characteristics are compatible with the cognitive style identified as field-independent, and also with numerical ability, one of the factors identified by intelligence factor analysis. While single factor constructs of intelligence have certainly been invalidated by current research, the label of separate intelligences for aspects of cognition does not appear to be warranted. Critiques of each of the seven MI intelligences and 97 references are included. (BCY)

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An Analysis of Gardner's Theory Of Multiple Intelligence

Harry Morgan

West Georgia College

Carrollton, Georgia 30118
404/ 834-8164

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Running Head: MULTIPLE INTELLIGENCES

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An Analysis of Gardner's Theory of Multiple Intelligence

Abstract

Gardner suggests that the human organism has seven distinct units of intellectual functioning. He labels these units, intelligences each with its own observable and measurable abilities.

The Gardner hypothesis of intelligence is examined within the context of g, and what others have identified as a unified theory of intelligence. Gardner's MI Theory is also compared to the work of cognitive style theorists.

Multiple Intelligences

It is unlikely these days that anyone seriously studying intelligence can avoid reading something related to the Gardner hypothesis of multiple intelligences (MI). Gardner (1983) proposes the theory that the human organism possesses seven distinct units of mental functioning. He labels these units "Intelligences". He also asserts that these separate intelligences have their own specific sets of abilities that can be observed and measured.

As of this writing there are possibly 100 or more articles, book chapters and similar citations associated with Gardner's concept of intelligence. The basic concept, however, has been completely described in the Gardner text (1983), and more recently, the MI theory has been framed in the form of scientific research (Gardner and Hatch, 1989). Here, I will limit itself to the two aforementioned published works authored by Gardner and associates because they embody the major work on the MI concept.

This writing is organized into four sections. Following an introduction. Section I will review selected theories of intelligence, the persistence of the concept of g, and the role of "factors" in

intellectual theories. Section II will discuss the characteristics of MI segments that are strikingly compatible with cognitive style constructs. Section III will compare MI Theory with what others have characterized as factors in a unified theory of intellectual functioning. Section IV puts forth step-by-step comparisons of MI Theory components to similar constructs in cognitive style theory.

The theory that multiple factors contribute to what is generally considered intelligence is not new. What is novel about Gardner's proposal is that each factor (as identified by his work), constitutes a separate construct that would qualify as an intelligence.

There is sufficient evidence, however, to suggest that the seven areas of human performance described in the MI theory are more realistically factors in general intelligence, and/or cognitive styles. The similarities are so striking, that it is surprising how cognitive style theory could have gone unnoticed by Gardner and Associates.

Gardner's seven "intelligences" are listed in Table 1 of this document. He describes the nature of these intelligences in various ways. Two of them, Logical

Mathematical Intelligence and Linguistic Intelligence, are defined as "superior sensitivities". Two others, Music Intelligence and Bodily-Kinesthetic Intelligence, are defined as "abilities". Another pair, Spatial Intelligence, and Interpersonal Intelligence, are described as "capabilities", and the Intrapersonal Intelligence is described as "access to one's own feelings". Bodily-kinesthetic are described as "abilities" and "skills". It stretches the limits of scientific imagination to accept such semantic diversity as a coherent theory of intelligence.

It is also Gardner's view, that each of these intelligences will direct the individual toward a career choice compatible with their intellectual abilities - referred to as End-States (Table I).

The notion that one's terminal career is directed primarily by one's attributes is to ignore personal and structural variables such as an individual's temperament, curiosity, persistence, risk-taking and opportunities, just to name a few. Between the 1920's and the Civil Rights Movement of the 1960's, for example, more black holders of doctorate degrees were employees in the U.S. Postal Service than in major

universities because of discriminatory practices. To conclude that their peculiar type of intelligence led them to the postal service (their end states), could not be defended.

An examination of Logical-Mathematical Intelligence and Spatial Intelligence reveal many common characteristics. Dissimilarities are also few between Linguistic Intelligence and Musical Intelligence. This is equally true for Intrapersonal and Interpersonal Intelligences. These six "intelligences" can be reduced to three descriptions of performance and abilities, along an equal number of continuums, because there is virtually no disassociation between the "intelligences" that I have paired.

Finally, there are theoretical and structural problems in labeling each ability an "intelligence". These problems can be described through a brief review of the work of Guilford (1967). Guilford described intelligence as encompassing five operations (divergent production, convergent productions, cognition, memory and evaluation). The same model included six products (units, classes, relations, systems, implications and transformations). It also included four content areas

(figurative, semantics, behavioral and symbolic). These three domains would generate 120 cells. Some cells match abilities that are typically measured by standardized intelligence tests, while others represent a multi-dimensional structure-of-intelligence. For example, memory for symbolic relations, would subsume mental operations and a form of content. Using the Gardner MI theory as a model, Guilford's work would have developed 120 "intelligences"!

I. THEORIES OF INTELLIGENCE: A REVIEW

There has been no single element in the defining and measuring of intelligence that has survived over time with greater persistence than the theory that intelligence can be determined by a single factor - labeled the g factor (Spearman, 1904; Terman and Merrill, 1937; Burt, 1940).

L.L. Thurstone, however, was among the first to suggest that the human organism was far too complex for intellectual activity to be determined solely by a single human factor. Thurstone (1938) developed what he labeled Primary Mental Abilities and introduced to the

intelligence testing community multivariate analyses to operationalize his theory. Thurstone's test batteries were developed for 3 age levels with approximately 6 tests designed to measure a separate ability. Thurstone's theory suggested that intelligence could not be determined by measuring a single ability, but multiple factors like verbal ability, deductive reasoning, spatial ability and perceptual speed are essential to a unified theory of intelligence. Despite Thurstone's new approach at that early date to the re-examination of a seasoned theory, it still remained the view of Spearman and his many followers, that Thurstone's "set of abilities" contained an underlying element common to all measures of ability that could be defined within the framework of g. There is some dispute as to the original inventor of factor analysis. Burt claimed this distinction, but most writers give the credit to Spearman.

Despite these views, the practice of intelligence testing began to incorporate Thurstone's multifactor analyses. Following Thurstone's (1938) publication of a test battery of primary mental abilities, others started to develop multivariate tests to measure separate

abilities - the work of Gardner has followed a similar pattern except for semantic applications.

Gesell (1949) for example, developed an age scale to measure infant development. The Gesell developmental schedules defined four areas of behavior, but did not claim that these were measures of intelligence. The Gesell behavior factors included; Adaptive Behavior (subject's reactions to objects); Motor Behavior (subject's control of body); Language Behavior (vocalizations and speech, bodily expression); and Personal-social Behavior (interpersonal relations). Many of his followers, however, using the Gesell model, developed instruments to assess these behaviors and labeled their instruments measures of "intelligence" Gesell's areas of infant behavior can be found in Gardner's Body-Kinesthetic Intelligence as motor behavior, in Interpersonal Intelligence and Intrapersonal Intelligence. as personal-social behavior, and in Linguistic Intelligence, as language behavior.

The most widely used IQ test, the revised Stanford-Binet - first published in 1916 - still provides a single score that purports to reflect general intelligence (Terman and Merrill, 1973). The Wechsler

Intelligence Scale for Children - Revised, is the next most commonly used instrument (Wechsler, 1974). Both are designed to be administered individually, with the Stanford-Binet emphasizing verbal responses more than the WISC-R.

The widespread use of these traditional instruments occur at a time when information processing theorists and others are suggesting alternative approaches, and in the process, are creating a receptive scientific environment for imaginative and inventive constructs (Elkind, 1971; Zigler & Tricket, 1978; Messick, 1973; McCelland, 1973; Sternberg, 1985; Bracken, 1987).

At several intervals in the history of various approaches to assessing intelligence, single-factor theorists have had to defend against occasional assaults (Hunt, 1961; Cattell, 1963; Horn & Cattell, 1967; Zigler, 1970; Elkind, 1971; Gould, 1981; McCelland,

1973; Charlesworth, 1976).

Despite the presence of an intellectual environment within which multi-factor theories, and various other models of intelligence can emerge, Gardner's MI theory does not appear to delineate itself from factors that have been identified by others. What is also interesting about Gardner's MI theory is its strong resemblance to cognitive style constructs (Vernon, 1973; Goodenough & Karp, 1961; Miller, 1987), and in some cases, match what other investigators have identified as factors in a unified theory of intelligence (Thurstone, 1938; Gesell, 1949; Guilford, 1956).

This paper will attempt to establish that MI theory is fundamentally a redefinition and reframing of selected IQ factors previously identified by others - and cognitive styles also previously identified by others - into seven currently defined "intelligences".

II. COGNITIVE STYLE AND MI THEORY

Cognitive style has also been referred to as psychological differentiation (Witkin, 1949; Dyk and Witkin, 1965; Gundlach and Gesell, 1979). Werner (1957)

was among the first to introduce the concept of psychological differentiation. He theorized that human development followed a biological course from a global state, to a state of differentiation, articulation and hierarchical integration.

Cognitive style has emerged as a construct that refers to the particularized and idiosyncratic modes that individuals employ in perceiving, remembering, organizing and evaluating information (Witkin, Dyk, Faterson, Goodenough, and Karp, 1962; Bloomberg, 1967; Ohmacht and McMorris, 1971; Vernon, 1972; Coates, 1975, Miller, 1987). These individual characteristics are not described as abilities, information content or intelligence. They embody processes that are typically employed in thinking, problem solving and various individual experiences (Wortheimer, 1945; Broverman & Lazarus, 1958; Broverman, 1964; Brown, 1985). The effects of cognitive styles are inherent in all human activities related to emotional, psychological and social environments (Wallach and Kogan, 1967; Wachtel, 1968; Vernon, 1973; Schmidt and Sinor, 1986; Goldstein, 1986; Haynes & Miller, 1987; Hadfield & Maddox, 1988; Kogan and Saarni, 1989).

III. FACTOR ANALYSIS AND THE MI THEORY

Spearman constructed intelligence tests in a manner that the concept of a single factor, g, would be assured. In such a design, Spearman started with the idea of a principal component, projecting a single axis, with other abilities projected at right angles being rotated for the highest potential. By selecting a principal component concept, and projecting each vector (subordinate factors) onto the axis, Spearman could always yield a single factor - but he conceded that there might be a specific factor unique to a particular test (Guilford, 1967).

Thurstone rejected the principal component approach to factor analysis, and proposed a rotated factor axis that in essence eliminated g in the process (Guilford, 1967; Gould, 1981). Thurstone and his followers proposed a set of primary abilities - verbal ability, deductive reasoning, spatial ability and perceptual speed - to account for a group of factors they considered essential to a measurement of intelligence

(Thurstone, 1938; Thurstone and Thurstone, 1946). Gardner, in developing the MI theory has composed an intermix with Thurstone's factors and labeled the new categories "intelligences" (Gardner and Hatch, 1989).

As Gardner proceeds to operationalize MI theory, and measure individual "intelligences", he tends to ignore the role of experience in achievement and performance. According to Gardner:

> In our own work, it rapidly became clear that meaningful assessment of an intelligence was not possible if students had little or no experience with a particular subject matter or type of material (Gardner & Hatch, p. 6, 1989).

When study and practice significantly effects an individual's score on a particular test, it is unlikely that it will produce a valid I.Q. score. Probably, more than anything else, such scores will be measures of maturation and experience.

IV. ARE THEY MULTIPLE INTELLIGENCES, OR ARE THEY COGNITIVE STYLES?

This section will review each of Gardner's intelligences in the hierarchical sequence of their listing in research literature (Gardner & Hatch, 1989).

Logical-mathematical Intelligence
Sensitivity to, and capacity to discern, logical or numerical patterns; ability to handle long chains of reasoning. END STATES: Scientist, Mathematician

Individuals inclined toward sensing, thinking and introvert cognitive styles - as described in the Myers-Briggs Inventory - would process information in idiosyncratic modes that would maximize their capacity for what Gardner describes as Logical-mathematical Intelligence.

Myers-Briggs' introvert types are preoccupied with work and concentration. Thinking types utilize logic and analysis, with the likelihood that emotion will not be allowed to interfere. Sensing types use standard procedures - with a concentration on valuable

information in problem solving (Myers and McCauley, 1985).

Individuals who process information in a field-independent cognitive style are analytical in perceiving, remembering and problem solving (Vernon, 1972; Messick, 1972; 1973). Significant correlations have been found among field-independence, logical reasoning, and direction following variables (Foreman, 1988).

Characteristics of the logical-mathematical type as described by Gardner would be highly compatible with attributes embodied in the field-independent cognitive style (Kogan & Kogan, 1970; Federico & Landis, 1984).

The logical-mathematical intelligence category as defined by Gardner, is also compatible with numerical abilities, an essential factor in Thurstone's (1938) set of abilities, defined as intellectual functioning.

Achievers in science and mathematics have been found to be field-independent (Wallace and Gregory, 1985; Burkhalter and Schaer, 1985). Significant correlations have also been found to exist between field-independent learners and proportional reasoning (Niaz, 1989). And, reflective cognitive style

Achievers in science and mathematics have been found to be field-independent (Wallace and Gregory, 1985; Burkhalter and Schaer, 1985). Significant correlations have also been found to exist between field-independent learners and proportional reasoning (Niaz, 1989). And, reflective cognitive style individuals reflect on the validity of solutions to problems, and ponder the possibilities prior to a thoughtful response (Kagan and Messer, 1975; Gullo, 1988).

The aforementioned evidence suggests basic similarities between Gardner's logical-mathematical intelligence, and cognitive styles of field-independence and reflection, and those cited from the Myers-Briggs Inventory.

Musical Intelligence
Abilities to produce and appreciate rhythm, pitch, and timbre; appreciation of the forms of musical expressiveness. END STATES: Composer, Violinist

The critical words to note in describing this intelligence are "produce" and "appreciation". There is a noticeable absence of the ability to produce and appreciate paintings, sculptures and other visual arts,

from Gardner's MI theory. It is probably safe to say that if one can produce music at the level of Gardner's designated end-state (composer, violinist), for musical intelligence, we can assume that there exists an appreciation - a priori (Copeland, 1983). Setting that aside and moving to consider the intelligence of producing music, we encounter elements of creativity. Cognitive style theorists have for some time investigated aspects of musical creativity and oral discrimination (Schmidt, 1984; Schmidt & Sinor, 1986).

Research on the construct, creativity, suggests that the end product needs to be deemed exemplary by creative peers on such dimensions as originality, flexibility, fluency and elaboration (Taylor, 1964). Upon examining the process, it has been shown that field independent persons are consistently more creative than their field dependent peers (Getzels and Jackson, 1962; Spotts and Mackler, 1967; Bloomberg, 1967; Gundlach, R.H. and Gesell, G.P., 1979).

Monsaas and Engelhard (1990) concluded from a study of individuals in 4 talent fields that highly competitive home environments contribute significantly to the success of individuals at the top of their

fields. This seemed especially true for highly accomplished pianists and research mathematicians.

This points up the risks involved in identifying performance as a determining index for capacity. The performance/capacity relationship has been a constant source of criticism of intelligence testing practice for some time now. An individual with rather modest intellectual capacity for learning to play the violin, for example, might be stimulated to maximize such ability - and become a competent performer - because of a positive role-model, tenacity, an opportunity, a particular temperament or curiosity, just to name a few variables.

Spatial Intelligence
Capacities to perceive the visual-spatial world accurately and to perform transformation on one's initial perceptions. END STATES: Navigator, Sculptor

Concerning the cognitive style Breadth of Categorization - sometimes referred to as Conceptual Differentiation, Kogan describes it as:

> When a person is made aware of the central-tendency or is given a focal exemplar of a particular category, wide individual variation has been observed in the setting of boundary limitations for that category. Some individuals are relatively narrow in the sense of rejecting instances that, in

> their subjective opinion, stray too far from the central or focal value; others are able to accommodate a broader range of instances of subjectively setting category boundaries a considerable distance from the central-tendency or vocal exemplar (Kogan, 1976, p. 60).

Spatial Intelligence as described by Gardner is highly compatible with the cognitive style construct of Breadth of Categorization. It refers to an individual's consistent cognitive preference for broad inclusiveness vs. narrow inclusiveness along a bipolar plain in establishing one's acceptance range of objects and ideas (Bruner and Tajfel, 1961; Messick and Kogan, 1965). Individuals with broad categorizing cognitive styles have a greater capacity to perceive the visual-spatial world and appear to match Gardner's concept of spatial intelligence. Several investigators have referenced these attributes as leveling and sharpening (Holtzman & Klein, 1954; Santostefano, 1964; Israel, 1969).

There are also computabilities within the Gardner spatial category with the work of cognitive style investigators related to sensory modalities and motor control (Birch & Lefford, 1967; Bissel, White & Zivin, 1971).

Bodily-Kinesthetic

Abilities to control one's body movements and handle objects skillfully. END STATES: Dancer, Athlete

What Gardner labels as bodily-kinesthetic intelligence is the most interesting of the seven intelligences identified through his work. What purpose, however, is served by delineating this category as a construct of intelligence? For we now know, that intellectual requirements for performance in gymnastics and sports are not fundamentally different from cognitive endeavors that do not necessarily call forth competitive type physical interactions, responses, and performances.

An essential element that appears to be common to all intellectual functioning is problem solving through the processing of information. Performance associated with problem solving skills are useful indices of intellectual capacity.

In classroom settings, problems are often presented in a well-structured format with the necessary information provided or close at hand. Problems to be solved by the athletic, however, are ill-structured and

fuzzy with myriad variations of unfolding human encounters within the field of play. A careful observation of a brief episode in a basketball or football game, for example, would reveal a performer processing a tremendous amount of information.

The successful athlete must have the cognitive capacity to differentiate between players, isolate spectator noise, execute memorized play action, and assess when the set play must be modified or abandoned - and insert a more suitable plan of action to achieve the "goal" while simultaneously calling upon the organism for extreme outputs of physical and mental responses.

Occasionally a basketball player during an exciting episode, will mistake an official for a teammate, and pass the ball to the official. Or, a football player will attempt to "score" at the wrong goal. The stream of sensory activity during play can become too complex to execute - except for those athletes who tend to have superior cognitive processing abilities in these environments.

The high levels of mental and physical abilities employed during the athletic performance, however, might not be available to the same individual

in the static environment of the quiet classroom. It is in this context that my previous work has attempted to identify a sensori-active cognitive style that tends to guide the information processing of certain individuals (Morgan, 1980, 1990; Elias, 1979; Einstein, 1979; Fiske, 1977).

Gardner's approach has been to set this cognitive style of processing information apart from other intellectual functioning. He then proceeds to label these performance cognitive styles - "bodily-kinesthetic intelligence".

Interpersonal Intelligence
Capacities to discern and respond appropriately to the moods, temperaments, motivations, and desires of other people. END STATES: Therapist, Salesman

Intrapersonal Intelligence
Access to one's own feelings and the ability to discriminate among them and draw upon them to guide behavior; knowledge of one's own strengths, weaknesses, desires, and intelligences. END STATES: Person with detailed accurate self-knowledge

Gardner's inter-intrapersonal categories will be treated as a single domain because of their obvious common characteristics, along a single continuum.

The <u>field-dependent</u> cognitive style implies that an

individual demonstrates a global and social orientation during interactions with objects and individuals (Frank, 1986; Kogan and Saarni, 1989; Jacobs, 1986). Field dependent individuals are also inclined to use social dimensions as their frame of reference in defining their own feelings and attitudes. They are more attentive to facial expressions, and more likely to remember facial features than their field-independent peers (Messick and Damarin, 1964; Wallace and Gregory, 1985).

Field-dependent preschool children tend to play with others while their field-independent counterparts show a tendency to sit alone with a table task (Coates, Lord and Jakabories, 1975). It also seems true, that field-dependent children are more responsive to social cues provided by an examiner in an experimental problem solving setting (Jennings, 1986; Ruble and Nahamura, 1972). Among elementary school children, it has been suggested, that they experience difficulty when working independently (Ennis and Chepyator-Thomson, 1989).

The work of Bieri (1961) identified the cognitive style labeled cognitive complexity vs. cognitive simplicity. This mode of processing information is

strikingly similar to Gardner's Intrapersonal Intelligence (Gardner, 1987). The complexity vs. simplicity construct is defined as the cognitive process utilized by an individual in defining their personal and social world. Work by others expanded the cognitive complexity domain to include the nature of individual choices and their associated values (Signell, 1966; Kogan, 1971).

Among the cognitive styles from the Myers-Briggs Inventory, the Extrovert types interact easily with people and prefer social variety. Feeling types base judgments on subjective values and demonstrate sensitivities toward the feelings of others (Myers and McCauley, 1985).

Gardner's interpersonal and intrapersonal intelligences can be defined within the constructs of the aforementioned cognitive styles. If, however, one accepts the proposition that these two intelligences are the same as social-intelligence, this would be the single construct among Gardner's seven, that some studies have recognized as an intelligence.

Thorndike (1936) concluded that the social domain of intellectual activity was more than a factor in

general intelligence, but was a separate entity that individuals demonstrated in response to the behavior of other persons.

Guilford (1958) accepted the idea that there is an intellectual behavior that involves insights into the thoughts and actions of others, but did not acknowledge an entity framed as social intelligence.

Studies of social intelligence over the past 50 years have conceptualized and measured this domain in various ways that match both interpersonal and intrapersonal constructs as defined by Gardner (Keating, 1978; Greenspan, 1980; Ford, 1983; Ford and Tisak, 1983; Frederiksen, 1984; Barnes and Sternberg, 1989).

Some studies seeking social intelligence have defined it as a cognitive process that enables individuals to successfully negotiate problem provoking human situations through social interactions and adaptation. Such studies have stressed external values of competence (Charlesworth, 1976; Barnes and Sternberg, 1989). This approach is similar to the one employed by Gardner in defining interpersonal intelligence.

Other studies have conceptualized and measured social intelligence as self-awareness, temperament and

individual social autonomy. These approaches emphasize internal affective variable (Greenspan, 1980), and match attributes described by Gardner as intrapersonal intelligence.

Scarr (1981) has sought social intelligence by selecting a combined (external and internal), set of abilities that demonstrate both pro-social and affective self awareness values. Here, the skills of communication and social adaptation demonstrated by individuals during real life experiences are considered essential.

Despite the variety of scientific studies in this domain, none have reported unequivocal certainties about the existence of social intelligence (Keating, 1978; Ford and Tisak, 1983; Ford, 1983; Frederikson, 1984; Barnes and Sternberg, 1989).

It is clear from current literature that researchers, practitioners and foundations have made personal and professional investments in MI as a new theory of intelligence, and, I do not take these commitments lightly. Gardner, as have many others, has provided sound reasons to encourage us to dismiss the single factor constructs of intellectual functioning.

Unequivocally, MI theory constitutes a major contribution to an already large body of knowledge related to this point of view. The label "intelligence", however, need not be called forth in this case in order to validate yet another novel approach to rejecting g.

From cognitive style researchers and practitioners we have come to know that the human organism receives information from various sources - from other persons, from the environment, and from itself - and, processes this information in psychologically differentiated ways. Cognitive style researchers, however, do not identify their work as "intelligence theory" because as in the case of MI theory, it does not qualify as such.

TABLE I

GARDNER'S SEVEN INTELLIGENCES

Logical-mathematical
Sensitivity to, and capacity to discern, logical or numerical patterns; ability to handle long chains of reasoning.
END STATES: Scientist, Mathematician

Linguistic
Sensitivity to the sounds, rhythms, and meanings of words; sensitivity to the different functions of language.
END STATES: Poet, Journalist

Musical
Abilities to produce and appreciate rhythm, pitch, and timbre; appreciation of the forms of musical expressiveness.
END STATES: Composer, Violinist

Spatial
Capacities to perceive the visual-spatial world accurately and to perform transformations on one's initial perceptions.
END STATES: Navigator, Sculptor

Bodily-kinesthetic
Abilities to control one's body movements and to handle objects skillfully.
END STATES: Dancer, Athlete

Interpersonal
Capacities to discern and respond appropriately to the moods, temperaments, motivations, and desires of other people.
END STATES: Therapist, Salesman

Intrapersonal
Access to one's own feelings and the ability to discriminate among them and draw upon them to guide behavior; knowledge of one's own strengths, weaknesses, desires, and intelligences.
END STATES: Person with detailed accurate self-knowledge

(Gardner & Hatch, 1989).

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